

ABSTRACT OF THE DISCLOSURE

The semiconductor device comprises a collector layer 14; a base layer 16 of a carbon-doped $\text{Ga}_x\text{In}_{1-x}\text{As}_y\text{Sb}_{1-y}$ layer having one surface connected to the collector layer 14; an emitter layer 18 connected the other surface of the base layer 16; a base contact layer 30 of a carbon-doped GaAsSb layer electrically connected to the base layer 16; and a base electrode 32 formed on the base contact layer 30. The semiconductor device of such structure can have a much reduced base resistance R_b , whereby InP/GaInAsSb-based HBTs including InP/InGaAs-based HBTs can have higher maximum oscillation frequency f_{\max} . Because of the carbon-doped semiconductor layer the semiconductor device can have higher reliability.